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Leah Gaeta, Ph.D.

Associate | Biomechanics
Natick
+1-508-903-4638 | lgaeta@exponent.com

Professional Profile

Dr. Leah Gaeta is an expert in Biomechanics, specializing in the intersection of wearable devices and soft robotics. Her interdisciplinary background bridges mechanical engineering and human biology to research and develop responsive, adaptable wearable systems that are biologically integrated and valuable to the end-user.

With a Ph.D. from Boston University, Dr. Gaeta focuses on technologies that augment human performance and enhance how individuals experience the world, particularly within the health, fitness, medical rehabilitation, and athletics industries. She leverages her expertise to provide clients with innovative solutions for complex biomechanical challenges, ensuring that wearable systems are both functionally robust and user-centric. By blending rigorous engineering principles with a deep understanding of human movement and physiology, she helps develop next-generation technologies that optimize physical capability and improve quality of life across diverse applications.

As a doctoral researcher in the Morphable Biorobotics Lab, Dr. Gaeta engineered and published soft robotic technologies that adapt to the human body and she is an expert in Human-Robot Interaction (HRI). Her research focused on stiffness localization for targeted force transmission and magnetic-based stiffness modulation for low energy consumption. While supported by the NIH, she led cross-functional experimental research, mentored engineering students, and collaborated with clinical partners. She possesses advanced technical proficiency in prototyping (CAD, UV/CO2 lasers, 3D printing, textile-based fabrication), mechanical testing (Instron, robot arms), image/video processing, and data science/machine learning techniques in Python. Furthermore, she has extensive experience instructing hundreds of students in MATLAB and C programming.

Dr. Gaeta's diverse professional history includes UX Research at ADP, human subjects research in the USC Biomechanics Lab, and medicinal chemistry research at Gilead Sciences. Additionally, her background as a fitness instructor for professional athletes and celebrities provides her with a unique, practical perspective on human performance and user-centered design in high-stakes environments.

Academic Credentials & Professional Honors

M.S., Mechanical Engineering, Boston University, 2025

Ph.D., Mechanical Engineering, Boston University, 2025

B.S., Human Biology, University of Southern California, 2013

National Institutes of Health (NIH) Fellowship: Health-Related Research through the National Institute of Biomedical Imaging and Bioengineering, 2022 – 2024

Distinguished Mechanical Engineering Fellowship, Boston University, 2021 – 2022

College of Engineering Scholarship (Full Award), Boston University, 2020 – 2021

Alpha Lambda Delta Honor Society, University of Southern California

Academic Appointments

Co-Instructor, Department of Mechanical Engineering, Boston University, 2022

Teaching Assistant, Department of Mechanical Engineering, Boston University, 2020 – 2021

Prior Experience

Doctoral Researcher, Boston University, 2021 – 2025

Co-Instructor, Boston University, 2022

Teaching Assistant, Boston University, 2020 – 2021

UX Research Coordinator, Automatic Data Processing, Inc., 2019

Senior Trainer, Studio Metamorphosis, 2015 – 2019

Fitness Instructor, Pilates Platinum, 2013 – 2016

Undergraduate Researcher, USC Biomechanics Lab, 2012 – 2013

Medicinal Chemistry Intern, Gilead Sciences, Inc., 2010 – 2011

Professional Affiliations

Institute of Electrical and Electronics Engineers (2021 – Present)

Massachusetts Association for Women in Science (2021 – Present)

Publications

L.T. Gaeta, V.T. Vo, S.-Y. Lee, S. Raste, M. Venkatesam, J. Rogatinsky, M.D. Albayrak, T. Ranzani. "Jamming Metal Sheets Using Electropermanent Magnets for Stiffness Modulation." IEEE Robotics & Automation Letters, Vol. 10, No. 8, pp. 7739-7746, 2025, doi: 10.1109/LRA.2025.3579246.

L. Kinnicutt, L.T. Gaeta, J. Rogatinsky, J. Lee, A. Cameron, A.J. Naik, D.T. Hess, and T. Ranzani. "A soft robotic, modular laparoscopic grasper for atraumatic retraction of the small intestine." Device, Vol. 2, Issue 10, 100560, 2024, doi: 10.1016/j.device.2024.100560.

L.T. Gaeta, M.D. Albayrak, L. Kinnicutt, S. Aufrichtig, P. Sultania, H. Schlegel, T.D. Ellis, and T. Ranzani. "A magnetically controlled soft robotic glove for hand rehabilitation." Device, Vol. 2, Issue 9, 100512, 2024, doi: 10.1016/j.device.2024.100512.

L.T. Gaeta, K.J. McDonald, L. Kinnicutt, M. Le, S. Wilkinson-Flicker, Y. Jiang, T. Atakuru, E. Samur, and T. Ranzani. "Magnetically induced stiffening for soft robotics." Soft Matter, vol. 19, no. 14, pp. 2623–2636, 2023, doi: 10.1039/D2SM01390H.

Presentations

L.T. Gaeta, V.T. Vo, S.-Y. Lee, S. Raste, M. Venkatesam, J. Rogatinsky, M.D. Albayrak, T. Ranzani. “Jamming Metal Sheets Using Electropermanent Magnets for Stiffness Modulation,” IEEE International Conference on Robotics & Automation, 2026, Vienna, Austria.

L.T. Gaeta and T. Ranzani. “Magnetically Induced Stiffening for Soft Robotics,” Material Research Society (MRS) Fall meeting, 2023, Boston, MA, USA.

L. Kinnicutt, J. Lee, J. Oden, L.T. Gaeta, S.K. Carroll, A. Rathi, Z.H. Lim, M. Lee, C. Orakwue, K.J. McDonald, D.T. Hess, T. Ranzani. “A Soft Laparoscopic Grasper for Retraction of the Small Intestine,” The Hamlyn Symposium on Medical Robotics, 2023, London, UK.

Additional Education & Training

Late-Entry Accelerated Program in Mechanical Engineering, Boston University, 2019 – 2021

Data Science, General Assembly, 2017 – 2018

Peer Reviews

IEEE International Conference on Intelligent Robots and Systems (IROS)

IEEE-RAS International Conference on Soft Robotics (RoboSoft)

IEEE Transactions on Robotics (T-RO)

International Journal of Robotics Research (IJRR)

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